

## ABSTRACT OF THE DISCLOSURE

A plasma processing apparatus comprises a grounded housing, a thin RF plate electrode, an opposite electrode facing the RF plate electrode, and a RF power source for applying a radio frequency to either the RF plate electrode or the opposite electrode to produce plasma between the two electrodes. If the radio frequency applied to the electrode is  $f$  (MHz), the parasitic capacity  $C$  (pF) between the grounded portion of the housing and a conductive portion through which the radio frequency propagates is less than  $1210 * f^{-0.9}$ . The thickness of the RF plate electrode is 1mm to 6mm, and it is supported by a heat sink. The heat sink has a coolant passage in the proximity to the RF plate electrode. The heat sink also has a groove or a cavity in addition to the coolant passage, thereby reducing the value of the dielectric constant of the heat sink as a whole.